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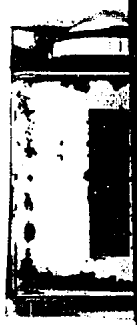

CZECHOSLOVAK COMMENT ON INDUSTRIAL ISOLATION OF COMPOUNDS BY MEANS OF ION-EXCHANGERS

[Comment: This report summarizes an article by Jar. Smid of the Czechoslovak Research Institute for Synthetic Resins (Vyzkumny ustav synthetickych pryskyric) published in Chemicky Prumysl (Chemical Industry), No 8, August 1954. In his article, Smid comments on an article on the same subject published in Chemicky Prumysl, No 6, 1954. Chemicky Prumysl is an organ of the Czechoslovak Ministry of the Chemical Industry.]

The possibility of the practical application of "Ionex" in extracting basic organic compounds from their solutions is discussed, for the first time in Czechoslovakia, in the article commented upon here. However, extraction of such compounds by this method is not new in Czechoslovakia. At the congress of research workers in macromolecular chemistry, held in Luhacovice in February 1952, Comrade Vrba, of the Research Institute of Pharmacology and Biochemistry, read a paper on extracting alkaloids with Czechoslovak "Katexes." This method is already being successfully used in Czechoslovakia, but plant technicians should write about their experiences in current literature, to stress the importance of utilizing Ionex in modern technology.

The article deals only with the isolation of basic compounds from organic solutions. To achieve this isolation the Research Institute for Antibiotics in Roztoky, near Prague, with no prior experience designed a four-part column for continuous operation. The column uses the maximum exchange capacity to great advantage. Maximum exchange capacity is the theoretical exchange capacity of the Katex when saturated with organic material and when the filtrate which leaves the Katex has the same concentration of organic bases as the liquid entering the filtrate.

On the other hand, in the treatment of boiler feed waters, only the so-called practical exchange capacity is used. The practical exchange capacity is the exchange capacity of the Katex used only to such a level that the concentration of the compound extracted from the solution does not exceed a previously set limit in the filtrate.

The authors have correctly shown the dependence of the time element on the contact of the solution with the Katex. In the regulation of water, this factor is called the specific capacity of the filter, and may be expressed by the following equation:

$$S = \frac{\text{number of liters of solution passed through filter in one hour}}{\text{number of liters of Katex on the filter in the swollen stage}}$$

The value of S varies with different Katexes used and depends on the reaction speed of each individual Katex, the macromolecular structure of the "Katex," the kind of extracted ions (atomic weight), the concentration of ions extracted from the solution, and other factors.

As far as the column itself is concerned, I am of the opinion that glass has many advantages over other materials used in building the column. Among the disadvantages of glass are primarily its brittleness and the resulting possibility of breakage, its poor resistance to sudden temperature changes, and, finally, the limited size of the column which the use of glass would permit.

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The carboxyl group ROA Katex used in the Research Institute for Antibiotics in Roztoky has a high theoretical exchange capacity, corresponding to almost 7-9 equivalents per one kilogram of dry Katex. This capacity, which is approximately four times greater than that of other Czechoslovak Katexes based on phenolformaldehyde and sodium sulphite, is obtained by controlling the macromolecular structure of the exchanger. This is accomplished by placing the carboxyl group in which the exchange takes place within the Katex in a side chain connected to the aromatic nucleus.

A great disadvantage of the carboxyl group ROA Katex is its high cost, which prevents widespread commercial use. Expensive raw materials have to be used in its production and the technology involved has not yet been perfected. However, since the Research Institute in Roztoky extracts very valuable compounds on Katex, its high cost is only partially reflected in the cost of the end product. This unusually excellent utilization of the ROA Katex can unfortunately not be achieved in other technological applications, where the high price of Katex would greatly increase the price of the end product.

Therefore, I would like to suggest the use of less expensive raw materials, while maintaining all other properties of the Katex, which would surely mean the greater expansion of its technological use.

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